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ABSTRACT

This paper presents two models, one for organizing institutional research and research data, and the other for applying research findings to the decision-making process. The model for organizing research consists of four subsystems: goal-setting, program development, cost-effectiveness, and program review. Each subsystem has a distinctive relationship to the decision-making process and to planning, and each has component data fields which identify and categorize information into seven subject categories: students, programs, community, facilities, finance, staff, and organization. The decision-making model describes an environment for converting research findings into planning concepts. Since planning should be a graduated process that involves the making of decisions which strike an even balance between political considerations and research data, this model takes both competing staff interests and research findings into account through decision alternatives. In the absence of a decision-making apparatus, research is fragmented with no central integrating mechanism and political expediency becomes the dominant force in decisions. These models seek to address the need of translating research data into planning concepts and decision-making alternatives, the crux of the research enterprise. (JDS)

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The Range and Organization of Data for Research

Richard L. Alfred

August 1976

Emerging research trends in the two-year college indicate that three major developments are now beginning to take place. Less a matter of technique than of recognizing the need to aid in decision making, these developments are closely correlated with the concept of accountability that has become the hallmark of the 70's. The first and perhaps the single most primary development is the greater emphasis on "applied" as contrasted to "theoretical" research--an occurrence which has led to the creation of useable rather than abstract models. The increase in the number of research projects devoted to specific problems rather than to investigation in general is a good example of this development.

A second development is the redefinition of functional objectives in institutional research. Research is shifting its focus to include topics such as enrollment projections, outcomes in career programs, economic impacts (of the college on the community), cost effectiveness, administrative organization, institutional goals, college governance, instructional effectiveness, community needs, and a host of other related topics. No longer are studies which merely tabulate student characteristics sufficient to satisfy the information needs of potential users. Needed are studies which concentrate on specific areas in response

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to individual needs rather than on student characteristics in general. Also needed are surveys to determine the educational needs of the community as special solutions are sought for the subcultural needs of particular segments of the population: rural, urban, ethnic, elderly citizens, and women's needs.

Finally, institutional research has become more sensitive to the need for empirical information pertaining to the characteristics of the community college as an organization responsive to community and legislative agencies. A premium is placed on information related to the quality of impacts produced *by* the college as contrasted to those imposed *on* it by the individuals and groups using its services. This development is clearly reflected in the number of recent studies conducted to determine student outcomes in the educational process.

Research Conceptualized

Given the emphasis of these developments on the practical aspect of research or that which must somehow relate to the information needs of faculty and administrators, we can define research as a process designed to assist institutions in: 1) defining goals and purposes, 2) identifying programs and policies to meet these goals, 3) evaluating programs to see if they are doing what in fact the institution says they are supposed to do, and 4) mapping the flow of resources to determine the cost effectiveness of college programs.

The sources of data are many ranging from the expressed needs of community subgroups to the published requirements of

state agencies, and their organizational value rests in the efforts of many to collect, organize and apply data in the decision process. At its best, research data is a constructive tool for management shaping and molding key decisions; at its worst, it is a useless adjunct to the decision process, usually window dressing for terminal decisions.

If we were to choose which role we would want research to play, most of us would probably select its management role. To be effective, we would say that research should have the capacity to change the decisions that affect institutional goals and purposes as well as to change the methods by which these decisions are made--that is to alter the structure of the decision process. For this to occur, we need to conceptualize research as providing three essential conditions for effective management. First, research should facilitate the efforts of faculty and administrators in establishing institutional goals and objectives; second, it should function in a direct relationship with the planning process; and, third, it should provide the means for the appraisal of institutional goals in the context of institutional programs and activities (evaluation).

There are several assumptions upon which these conditions rest:

*Facing an uncertain future, administrators are sensitive to the need for research to assist in the formulation (or modification) of institutional goals.

*Research, as an effective part of the decision process, should both precede and follow from institutional goals

*Research, as a pivotal element in goal-setting, should play a key role in planning for the long-range development of the institution.

*A recognized apparatus exists in every institution for the conversion of research findings into planning concepts and decision alternatives

*Comprehensive data systems, once organized, will be used by faculty and administrators to guide the further development of the institution through variable internal and external conditions

If we can accept these conditions and assumptions, then a conceptual foundation for research will have been established and a system designed for its organization into data fields.

The Organization of Data

Figure I presents a diagram of the conceptual model just described. This model identifies four subsystems in research: goal-setting, program development, cost effectiveness and program review. Each subsystem has a distinctive relationship to planning and decision making and each has component data fields which identify and organize information into subject categories. These data fields are the following: students, programs, community, facilities, finance, staff and organization.

All seven of the data fields operate in each subsystem but do so primarily in accord with their relationship to the sequence of activities in the institution. For example, data that relate to goal setting typically involve the nature of the community to be served and are collected early in the life of the institution. Data related to program development are important

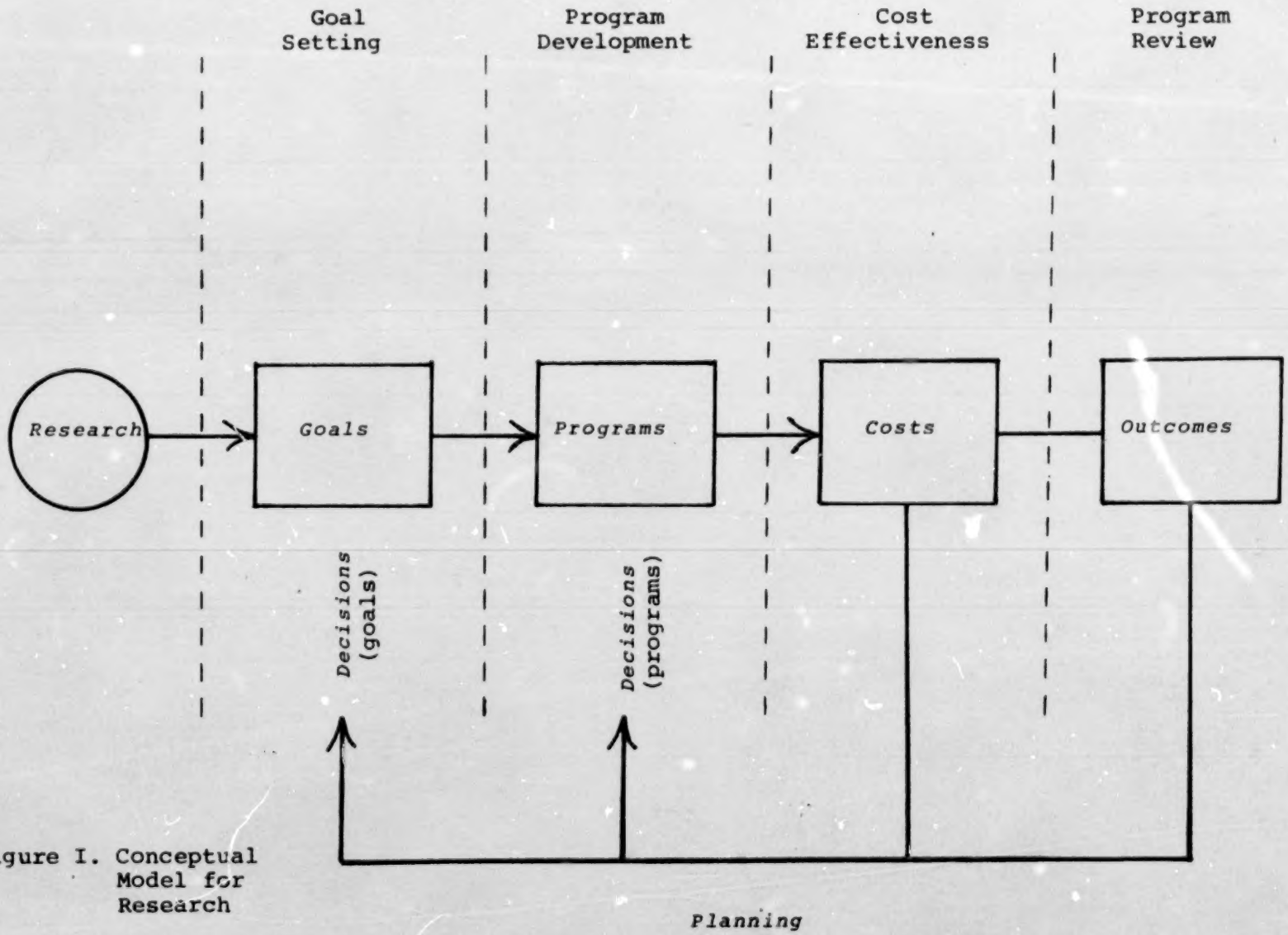

Figure I. Conceptual Model for Research

at a later stage in the institution's development taking the form of market analyses and community need surveys to identify the types of programs that need to be offered. And, finally, data related to the cost effectiveness and program review subsystems are highly specific designed to describe the outcomes and costs of college programs and to relate them to the goals of the institution.

Before discussing in greater detail the management uses of research data and its relationship to planning and decision making, let us consider briefly each of the four subsystems and the types of data that are incorporated into each.

Goal Setting. Most two-year colleges develop a general set of goals growing out of a basic philosophy at an early point in their development. Henceforth, such goals receive little attention except in relation to visits from regional accrediting associations when an attempt it made to relate them to descriptive data collected after the fact to demonstrate that goals are indeed being met. Unfortunately, these goals normally are not defined in such a way as to make them effective in guiding institutional development. Neither do they receive the regular review and evaluation by faculty and administrators that could make them a vital force in management.

Every institution should collect data which can become a source of direction for determining the types of goals the institution should pursue. It is not enough for a college to commit itself to offering career programs simply because this is a goal normally pursued by a comprehensive community college.

Ideally this goal should be determined in accord with data describing regional and local needs for career programs. It should be phrased in terms of the total percentage of enrollment to be served by such programs, the relationship of these programs to manpower needs of the community and the actual number of positions to be filled by program graduates. In a similar fashion, a goal concerning guidance services should identify through research the kinds of needs students have for such services as well as the anticipated results. Obviously, the formulation of goals which are a direct result of research data will not be easy in many areas, but the effort must be made if goals are to serve as a yardstick for institutional development.

Some areas for concern that need to be addressed by community college research in the goal-setting subsystem are the following:

Community

a) Studies of the geographical characteristics of the college service region

*size (in square miles)

*distribution of population

*zoning characteristics of region

*natural barriers to campus development

b) Studies of the demographic characteristics of the college service region

*population density

*population composition

age
sex
level of education

race and ethnicity
occupational status
family income
dwelling units
etc.

*in/out migration (population growth)

*transportation facilities

c) Economic studies

*number and type of business and industrial installations

*manpower distribution (by occupation)

*regional projections for manpower needs (by occupation)

*rate of unemployment

*percentage of population employed in "growth" and "no growth" occupations

d) Studies of postsecondary institutions and programs

*number and type of postsecondary institutions in service region

*number and type of postsecondary institutions in areas outside of service region

*career and general education program offerings in postsecondary institutions

*community service and continuing education offerings in postsecondary institutions

*articulation policies and procedures

e) Studies of individual and group perceptions of college goals

*Delphi technique

*Institutional Goals Inventory

*other standardized instruments

*community needs surveys

*other

f) Studies of state and regional statutes regulating institutional goals

g) Other

Program Development. Organizing for effective programs requires a total conceptual framework beginning with a stated mission and ending with a systematic approach to evaluation. This by necessity involves a market analysis of community educational needs and their translation into programs that must be operated in support of stated goals.

Numerous market analysis models are available but they all are based on the general assumption that educational programs should both follow and support the educational needs of the community. Figure 2 depicts the various steps in a market analysis. In every metropolitan region in the United States, census data are available that describe the population in terms of characteristics such as age, sex, race, ethnicity, veterans status, occupational status, family income, education level and unemployment. Program objectives should follow market projections of community needs and should be stated in concrete performance terms. They should define the types of population subgroups to be served, the types of needs that have been identified, and the types of programs to be offered.

Program objectives developed through research on community needs carry forward the process through which programs are institutionalized. If properly stated, objectives should enable faculty and administrators to appraise programs in the context of current resources and to measure effectiveness against a

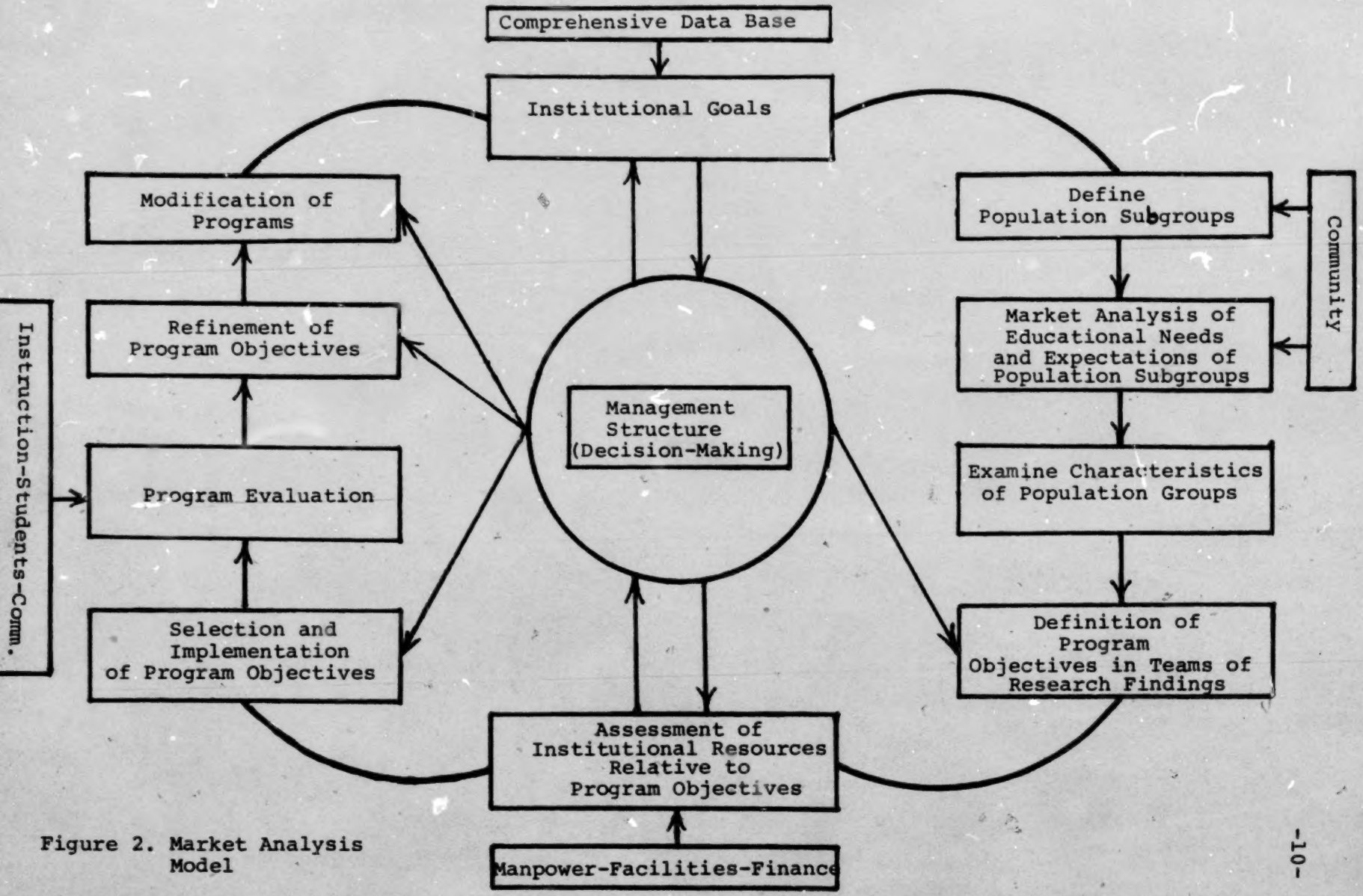
Comprehensive Data Base
Institutional Goals
Modification of Programs
Refinement of Program Objectives
Program Evaluation
Selection and Implementation of Program Objectives
Management Structure (Decision-Making)
Define Population Subgroups
Market Analysis of Educational Needs and Expectations of Population Subgroups
Examine Characteristics of Population Groups
Definition of Program Objectives in Teams of Research Findings
Assessment of Institutional Resources Relative to Program Objectives
Manpower-Facilities-Finance
Instruction-Students-Comm.
Community

Figure 2. Market Analysis Model

series of short and long-range planning yardsticks. The types of research which have been collected in this area in the recent past can be summarized as follows:

Community.

a) Studies of educational needs and characteristics of out-of-school citizens (18 years and older)

b) Studies of educational needs and characteristics of secondary level students

c) Studies of local employer needs and perceptions

d) Projections of manpower needs by civic agencies

e) State and federal projections of manpower needs

Programs.

a) Appraisals of state and regional regulations guiding program development

b) Studies of program offerings in other postsecondary institutions

Students.

a) Enrollment projections

*institution
*division
*department
*course
*section

b) Studies of educational needs and characteristics of enrolled students

c) Studies of student transfer rates between postsecondary institutions

Finance.

a) Projections of program costs

b) Projections of revenues generated by programs

Facilities.

a) Projections of amount of space required by programs (square footage)

b) Projections of type of space required by programs (laboratory/lecture/office/etc.)

Staff.

a) Projections of staffing requirements of programs

Program Review. The third subsystem in institutional research is the "program review" or what is commonly known in the jargon of education as "evaluation." This subsystem is perhaps the single most routinely examined area in community college research today. Studies of student attrition, grade distributions employer follow-up surveys, student perceptions, graduation rates, transfer performance, etc. are a good example of the research in this area. The focus is on student outcomes and the methods used are as diverse as the research itself. The best way to describe this subsystem is through a diagram of the relationship of outcomes to program structure in the community college.

In theory, programs consist of a series of activities designed to move students from one status to another. A model developed by Astin uses the concept of "outputs" to describe the progress of students in relationship to programs. In this model, the background characteristics of entering students, the objectives of the program and descriptive measures of the college environment are considered as "input" (see Figure 3). An"expected" output theoretically at any time in the life of a program based on these input characteristics can be computed and the effect statistically removed from "observed" outputs

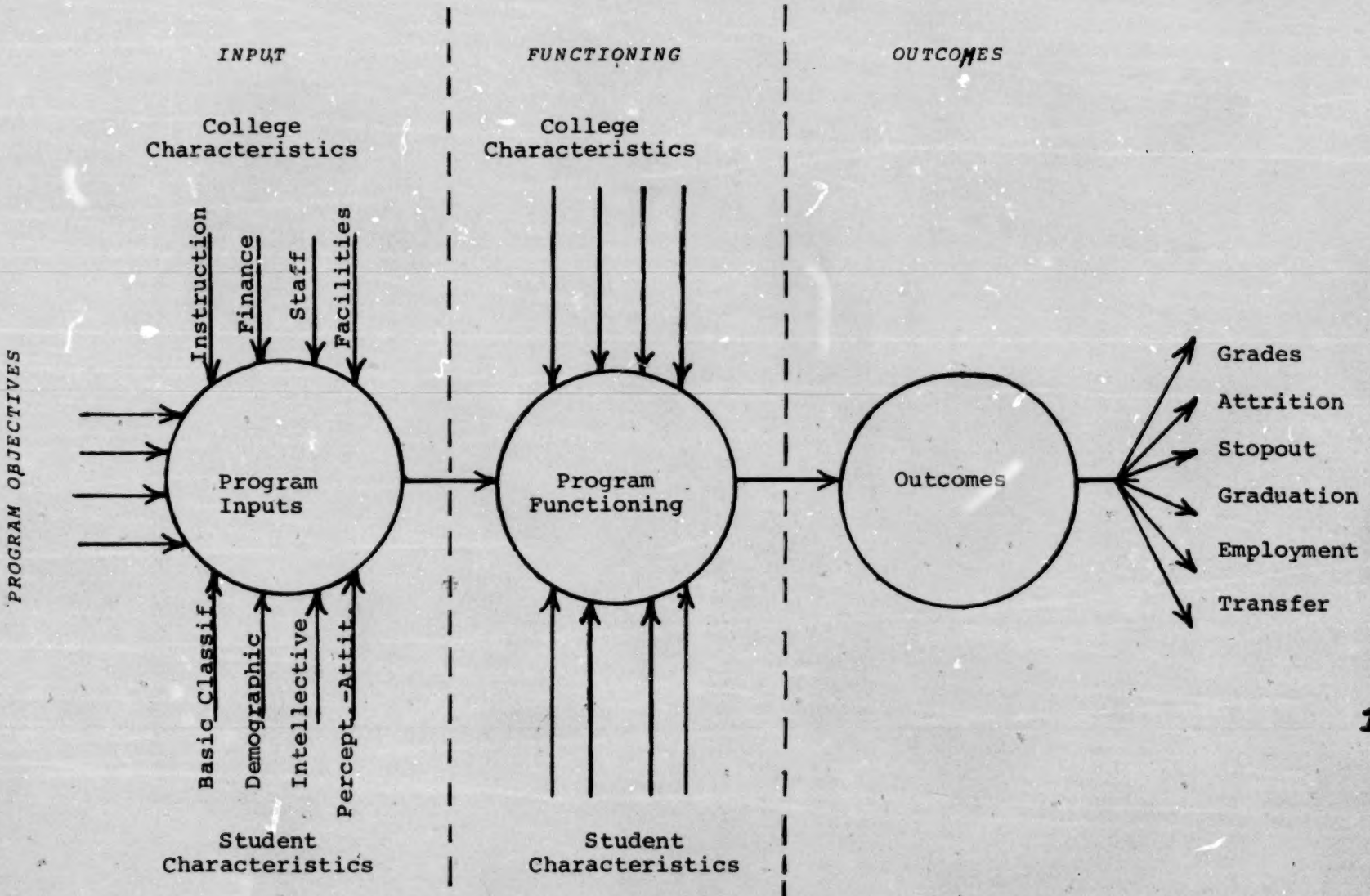

Figure 3. Input-Output Model of Program Functioning.

(actual scores on the variable or variables under investigation) producing a "residual" output which is independent of the input characteristics. Measures of the characteristics of the college and the program can then be related to this residual output to appraise the functioning of the program. This process culminates in the formation of evaluation measures which describe program functioning in terms of student outcomes as well as the effectiveness of the program in producing conditions which lead to outcomes.

Programs can be measured at three different intervals; at the time of initial student enrollment (input); during the period of enrollment (functioning); and after termination of study (output). This progression is reflected in the studies commonly conducted in the area:

Organization

a) Studies of the climate and characteristics of the institution

Programs.

a) Studies of the objectives and characteristics of college programs

*objectives
*courses
*staff
*facilities
*instructional methods
*instructional resources
*budget
*other

Students.

a) Studies of the characteristics of enrolled students

*basic classification
*demographic
*intellective
*perceptual-attitudinal

b) Studies of grade distributions (summaries and comparisons)

c) Studies of the characteristics of graduating students

d) Student attrition studies

*number and characteristics of students
*credit attrition (course withdrawal)
*college attrition (withdrawal from college)

e) Research on stopouts

f) Studies on transfer students (number and destination of transfers, credits accepted, etc.)

g) Transfer follow-up studies (academic achievement of transfer students in subsequent institutions)

h) Studies of certification/licensure results (student scores on required examinations for career entry)

i) Research on further educational degrees obtained by students

j) Research on employment patterns of students (number of students permanently employed by type of employment)

k) Research on employer evaluations of student preparedness and job performance

l) Research on student perceptions of college

*of curriculum (career and transfer preparation)
*of faculty and staff
*of campus life
*other

Community.

a) economic impacts of the college on the community

Cost Effectiveness. The fourth subsystem in institutional research responds to the need of community college planners for a gross quantitative measure of the cost effectiveness of present programs and for an estimate of the major consequences of decision alternatives. Since only enrollment-based information currently meets the criterion of credibility, cost effectiveness

analyses have been limited to data which examine only the quantity of output. This type of analysis produces at most a unit cost for each operation and should more appropriately be labeled "cost analysis".

Some of the studies that have been conducted in this area, which taken together provide the ingredients of a unit cost are:

a) enrollment analyses
   *units of analysis
      headcount
      FTE
      credit hours
      weekly student contact hours
      other

   *levels of analysis
      college
      division
      department
      course
      section

Staff.

a) Studies of faculty load (allocation of time to programs and functions)

b) Studies of staff salaries and fringe benefits

Finance.

a) Studies of supply costs

Facilities.

a) Research on facilities utilization

b) Studies of energy costs

Specialized Research Studies. The final subsystem for research is made up of studies conducted in response to special needs identified by the institution or its constituencies. Often designed to collect data defined in previous subsystems but for different reasons, this subsystem would include the following

studies:

a) institutional (or campus) feasibility studies

b) bond issue and levy election studies

c) annexation studies (of school districts)

d) institutional self-studies

e) collective bargaining studies

f) trustee subdistricting studies

g) other studies as may be mandated by emerging issues

Although this list is only partial, it does depict the relationship of these studies to emerging issues in community college education.

Planning and Decision Making

The translation of research data into planning concepts and decision alternatives is the crux of the research enterprise. Management decisions do not simply follow from the existence of research data. Whether at the two-year or four-year college, there are persistent problems just as there are persistent results. First and foremost, and for many reasons, there is a problem of management sensitivity to the need for converting research data--past, present, and future--into planning concepts. Once data are in hand regarding program outcomes, management guidelines are necessary for their translation into planning alternatives. This involves system-wide priorities and requires that administrators maintain some form of decision apparatus for the conversion of data into action.

Many administrators have failed to attend to this need and lapse into lethargy when the realization sinks in that they must assume a leadership role if planning is to be successful. The absence of a decision making apparatus culminates in a hard core of unanswered questions that plague the educational planner: What are the uses of research data in community colleges? What procedures should be used for the conversion of data into planning concepts? Who should be responsible for assessing the implications of various data trends and advising management of decision alternatives? What is an appropriate balance between politics and research in the planning process? How can research data be used to "improve" management decisions? What is the value of planning in an institutional setting in which political concerns often override planning alternatives? Satisfactory answers to these and other questions will be required if two-year colleges are to conduct meaningful research programs.

Figure 4 persents a decision model that depicts the environment for converting research findings into planning concepts. The reader will immediately recognize in this schematic the characteristic of competing staff interest which has proven so dysfunctional for community colleges. Ideally, planning should be a graduated process that involves the making of decisions that strike an even balance between political "considerations" on the one hand and research data on the other. Too often, however, political expediency has been the dominant force in decisions with research a superficial adjunct to the

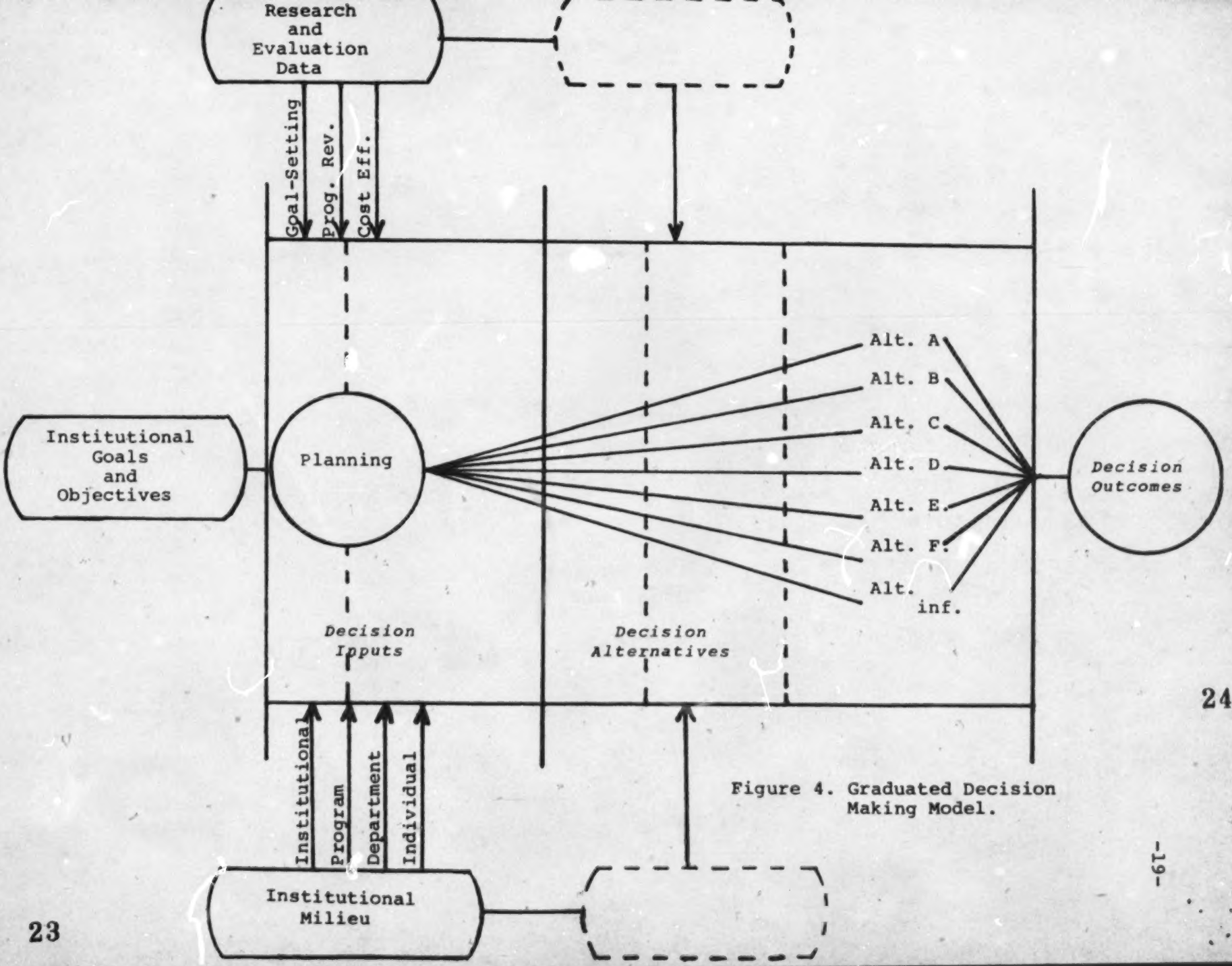

Figure 4. Graduated Decision Making Model.

process. This is most evident in the ability of administrators to manipulate research findings into a framework congruent with their value expectations in making decisions that affect the course of the institution.

Institutional constituencies, depending upon their numerical size and internal cohesiveness, bring different value perspectives to the decision process. To the extent that these different value perspectives are identified and understood, research can be effective as a guide to institutional development. The decision model, by posing different alternatives from research findings to faculty and administrators, can be used to forge decisions regarding long range development. Using available data in combination with stated institutional goals and staff input, decision alternatives can be constructed. These alternatives range from that which represents a pure political solution to the task ahead to that which represents a data-based approach to long range planning. The probable solution likely rests somewhere in the middle but the task itself of identifying potential alternatives is sufficient to point faculty and administrators in the direction of planning.

In the absence of a decision making apparatus to convert research data into planning concepts, research is fragmented with no central integrating mechanism. This results in a pattern of vested interests that more often than not lacks credibility as an objective base for planning. A decision model should be developed that is sensitive to the political climate in which an institution functions as well as the need for time in which

to develop decision alternatives. It should not assume that the values and interests of college constituencies will always be compatible with research data but it should assume that administrators will be able to achieve consensus with regard to decision alternatives if given accurate and meaningful information.

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